Thermochemical Equations

The complete combustion of pure, liquid acetic acid to form liquid water and carbon dioxide gas at constant pressure releases 871.7 kJ per mole of acid.

i) Write a balanced thermochemical equation for this reaction.

ii) Draw an enthalpy diagram for the reaction.

iii) If 0.500 g of acetic acid is burned, what amount of energy is released?

Consider the following reaction, which occurs at room temperature and pressure:

$$2Cl_{(g)} \rightarrow Cl_{2(g)} \qquad \Delta H = -243.4 \text{ kJ}$$

Which has a higher enthalpy under these conditions, 2Cl or Cl_2? Explain.

Consider the following reaction:

$$CH_3OH_{(g)} \rightarrow CO_{(g)} + 2H_{2(g)} \qquad \Delta H = +90.7 \text{ kJ}$$

i) Is heat absorbed or evolved in the course of this reaction?

ii) Calculate the amount of heat transferred when 60.0 g of methanol is decomposed in the above reaction at constant pressure.

iii) For a given sample of methanol, the enthalpy change on reaction is 18.5 kJ. How many grams of hydrogen gas are produced?

iv) What is the value of ΔH for the reverse of this reaction? How many kilojoules of heat are released when 27.0 g of CO(g) reacts completely with H_2(g) to from CH_3OH(g) at constant pressure?

The value of $\Delta H°$ for the reaction below is -1107 kJ:

$$2Ba\,(s) + O_2\,(g) \rightarrow 2BaO\,(s)$$

How many kJ of heat are released when 5.75 g of Ba reacts with 0.230 g of O_2 to form BaO (s) ?